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ABSTRACT

Current writings on the functions of the left and right hemispheres of the brain are examined, focusing upon possible implications for improving present educational techniques. It has been generally accepted by researchers that the organizational and verbalizing processes are functions of the left cerebral hemisphere, while creative and intuitive processes are functions of the right. Because of the value placed on verbalization, planning, ordering of facts, and numerical calculations, the American school system provides education almost totally devoted to developing the verbal and rational left brain hemisphere. With the exception of a few elective courses, the intuitive and creative right hemisphere is unrecognized in the school curriculum and goes largely untaught. It is widely agreed, however, that solving complex problems in changing circumstances requires the activity of both cerebral hemispheres working together. Creative dramatics offers an experience in holistic learning--using both cerebral hemispheres and, hence, the whole brain. Creative dramatics techniques may be used to teach almost any subject that requires the organization of ideas or the reinforcement of specific mechanical, sequencing, and imagery skills. The phases of creativity employed in creative dramatics are outlined in this paper, and ascending levels of creativity are described. (JD)

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EXPLORING THE RESEARCH CONCERNING LEFT HEMISPHERE/RIGHT HEMISPHERE COGNITIVE PROCESSES AND EXAMINING ONE INSTRUCTIONAL TECHNIQUE WHICH MAY BE IMPLEMENTED ACROSS THE CURRICULUM TO PRODUCE HOLISTIC THINKERS

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Recent neurological research into the cognitive processes of the brain through the work of Roger W. Sperry with commisuritory patients, and the studies of blood flow patterns by Niels Lassen and David Ingvar offer new insights into the theories about the various processes and capabilities of the human mind, as well as into Freud's theories of the origins of creativity, by demonstrating the separate capabilities and functions of each hemisphere of the brain. The work of Joseph Bogen and L. S. Basser demonstrate the necessity for finding ways within our educational system to relieve the current emphasis on verbal, analytical activities inadvertently designed to educate the left hemisphere exclusively, and to broaden the scope of activities to develop the creative potential of the right hemisphere as well. Carl Sagan and Sally Springer emphasize the possibilities within the educational system to develop students who can think holistically because their creative, imaging, verbal, and analytical skills have been developed, and who can utilize their total mental potential. One instructional technique offering the exercises necessary to develop holistic thinkers is creative dramatics, a method which has application across the academic curriculum, and which necessitates only the training of teachers for its implementation. It is the intent of this paper to summarize the research supporting the need for developing holistic thinkers, and

to explore the reasons that creative dramatics techniques offer guided exercises in the development of the strengths of each hemisphere of the brain.

According to J. P. Guilford's Factor Analysis of the intellect, the mind consists of 120 different factors or abilities, of which fifty are known. Guilford categorizes the abilities broadly into memory abilities and thinking abilities. He then divides the thinking abilities into three categories: cognitive, productive, and evaluative. The productive processes are then split into convergent and divergent thinking (Kneller, pp. 39-40).

When Roger W. Sperry and his associates were working with commisuritory patients (epileptic patients whose seizures necessitated the severing of the corpus callosum, the connecting nerve cable between the two cerebral hemispheres) in the 1950's and 1960's at Cal Tech, they discovered evidence that not only were the productive processes of the intellect divided into separate styles of thinking, but that each style seemed to be a function of separate parts of the brain (Edwards, pp. 35-36). Later studies, Basser (1962), Bogen and Gazzaniga (1965), Benton (1968), and Bogen (1969), with brain damaged patients, as well as studies with normal subjects, White (1969); Geffen, Bradshaw, and Wallace (1971); and Cohen (1973, further verify the concept of cerebral lateralization (Murray, pp. 19-23).

Recent research with studies of blood flow through the brain seems to provide physical evidence to support the theories of Sperry and other researchers. Modern techniques of measuring blood flow in an awake and functioning human were developed by Niels Lassen, David Ingvar, and others, using radioactive isotopes injected into the blood stream which are monitored as the blood flows through the brain. The results of studies of cerebral blood flow during various physical and mental activities has been quite impressive. "Although the most striking pattern of blood flow show differences from front to back across the whole brain, differences between the hemispheres have also been found....Small but highly significant hemispheric differences in blood flow of about three percent were found...As expected, the mean left-hemisphere flow was greater during the verbal analogies task, and the mean right hemisphere flow was greater during the picture completion" (Springer, pp. 93-94).

Guilford defines convergent thinking as a process in which "the problem is given, a standard solution or single right answer exists." (Kneller, pp. 39-40). According to current research, the left hemisphere of the brain seems to "analyze, abstract, count, marks time, plan step-by-step procedures, verbalize, and make rational statements based on logic (Edwards, p. 35). Levy-Agresti and Sperry

(1968) suggest that the left hemisphere of the brain operates in a logical and analytic manner, allowing the sequential information processing necessary for language (Murray, pp. 23-25). Moates and Schumacher write that "the key to a cognitive mechanism underlying the contextual findings seem to lie in a structure or process that produces a coherent ordering of an individual's knowledge" (Moates and Schumacher, p. 190). Counting, verbalizing, producing a coherent ordering of knowledge are all functions of divergent thinking. Therefore, the processes of divergent thinking appear to belong to the functions of the left hemisphere of the brain.

Divergent thinking is defined by Guilford as "thinking in which the problem is yet to be discovered; no set way of solving it exists, but a range of solutions is possible" (Kneller, pp. 39-40). According to current research, the right hemisphere of the brain "sees how things exist in space and how the parts go together to make up the whole... (it) understands metaphors, dreams, creates new combinations of ideas, uses intuition and has leaps of insight without figuring out thir[illegible]n a logical manner...the right hemisphere is subjective, relational, holistic, and is time free. It is not good at categorizing, naming, or sequencing. It seems to regard the think-as-it-is, at the present-moment

of seeing things for what they simply are, in all their complexity" (Edwards, pp. 35-36). The right hemisphere seems specialized for Gestalt perception as a synthesist ..." (Murray, p. 24). The strengths of the right cerebral hemisphere are those processes that make up divergent thinking. Therefore, the processes of divergent thinking appear to belong to the right hemisphere of the brain. However, the neo-Freudians believed the creative process to be "a product of the preconscious rather than (of) the unconscious mind...(it) differs from the unconscious in being open to recall when the ego is relaxed...the preconscious is the source of creativity because of its freedom to gather, compare, and rearrange ideas...(Kneller, p. 33). Whether the creative process is a function of the unconscious or the preconscious mind, the elements of the creative process, the gathering, comparing, and rearranging of ideas, appear to be functions of the right hemisphere of the brain.

It appears, then, that the organizational and verbalizing processes are functions of the left cerebral hemisphere, while the creative and intuitive processes are functions of the right. Psychoanalyst David Galin postulates that this is the case, and uses the research with commisuritory patients to provide neurological validation for Freud's unconscious mind. Galin demonstrates that the

right hemisphere's mode of thought is similar to Freud's description of the unconscious, and notes a parallel between the functioning of the isolated right hemisphere and mental processes that are repressed, unconscious, and unable to control behavior directly. These functions include the "extensive use of images, lesser involvement in the perception of time and sequence, and limited language of the sort that appears in dreams and slips of the tongue..." He also theorizes that "although each hemisphere is exposed to the same sensory input, it effectively receives a different input because each emphasizes only one of the messages. The left will attend to...verbal cues, and the right will attend to the nonverbal cues" (Galen, pp. 573-582, quoted in Springer, p. 196).

Kneller also states that "this creative flexibility can be hindered by conscious (left hemisphere?) thinking which is conventional and over literal, associating ideas according to (previously) established connections" (Kneller, p. 33). Because of the extreme value placed on verbalization, planning, ordering of facts, and on numerical calculations in our culture, the American school system provides an education almost totally devoted to developing the verbal, rational, on-time left hemisphere of the brain. The "dreamer, the artificer, the artist is, with the exception of a few

elective courses, lost in our school system and goes largely untaught. We are certainly aware of the effects of inadequate training in verbal, computational skills. If the left hemisphere processes are neglected, the effects of the neglect seem to be irreversible, and the student may face lifelong handicaps..." (Edwards, p. 26).

What of the right hemisphere which receives little or no training at all within the current educational system? Unless an individual somehow discovers the hidden capacity of the brain and develops its potential in spite of the lack of reinforcement from society and the schools, a large proportion of the ability of the human mind is lost. Included in that lost potential must be a vast amount of the creative capabilities of the right hemisphere of the brain in both past and current school populations, as well as the vast untapped possibilities of whole brain thinking that would actualize the processes of each hemisphere concurrently.

Murray proposes that reinforcement theory is at least a partial explanation for the development of preferred cognitive style in any individual, or culture. She writes that "Gazzaniga (1971) has demonstrated that...the hemisphere most successful in earning positive reinforcement became the dominant mode. Early reinforcement of the style of one side of the brain in humans, which is then constantly repeated, may well provide the intellectual set for a

lifetime of learning...This cycle would be self-sustaining in showing a definite predilection for learning in one hemisphere and therefore would be quite resistant to the other, little used mode of information processing..." (Murray, p. 31).

Sally Springer, in her book LEFT BRAIN, RIGHT BRAIN, asks, "Does the school program restricted to reading, writing, and arithmetic educate mainly one hemisphere and leave half of an individual's potential unschooled? Is the entire educational system biased against developing right hemisphere talents?" (Springer, p. 163)

Joseph Bogen, one of the pioneers of the commissurotomy procedure, has been an especially avid proponent of developing what he calls "appositional thinking" in school. The word "propositional" was adopted by neurologist John Hughlings Jackson in the nineteenth century to describe the left hemisphere's dominance for speaking, writing, calculation, and related tasks. In contrast, Bogen coined "appositional" to refer to the information processing of the right hemisphere in well lateralized right-handers. In Bogen's view, society has over-estimated propositionality at the expense of appositionality. He argues that our measures of intelligence, such as I. Q. tests, are "very narrow and do not take into account artistic creativity and other not easily quantifiable right-

hemisphere skills" (Bogen, pp. 24-32).

"The idea that half of our mental capability is neglected, more precisely the right half, has been appearing with increasing frequency in educational journals...and other publications" (Springer, 191-192).

"The person perhaps most responsible for current interest in the development of lateralization (as applied to learning) was Eric Lenneberg, a psychologist at Cornell University. In the mid-1960's, Lenneberg reviewed a variety of evidence and concluded that lateralization of function in the brain develops over time, but is complete by puberty." Because puberty marks a crucial time in language learning other than the native language of an individual, he believed it was "not merely a coincidence that both lateralization and language-learning ability appear fixed at puberty" (Springer, p. 132).

Lenneberg relied heavily on the clinical data collected by neurologist L. S. Basser, whose work with brain injuried children indicated that aphasia or speech disturbances very rarely follows damage to the right hemisphere but occurs even more often after damage to the left half of the brain. Brain injury before the age of two years, results in the same speech problems whichever side of the brain is involved. But by age 10, speech difficulties are the result of injury in 85% of the patients who experience left

hemisphere damage, and only 4% of those having injury to the right brain (Springer, p. 132).

When brain damage is so severe that one-half of the brain must be removed in infancy, development of lateraization may be studied with more specificity. In adult hemispherectomy patients, aphasia results from the removal of the left hemisphere, but removal of the right hemisphere typically results in little or no language impairment. In children, "the severity of impairment is directly related, and the prognosis for recovery of language is inversely related, to the age of the child at the time of surgery" (Springer, pp. 136-137). Several reports have noted that if surgery is performed early enough in infancy, no signs of lateralized deficits in higher mental functions remain in adulthood. This finding suggests that the remaining hemisphere, whether it is the left or the right, is able to take over for the hemisphere that is removed and to preserve those functions that would ordinarily be lateralized to the other half of the brain.

"It is possible to draw at least two different theoretical conclusions..(that) no shift of functions...(occurs) in early hemispherectomy patients because lateralization of function is not present in early infancy...or that the young brain has tremendous ability to reorganize itself" (Springer, pp. 136-137).

The important implication for educators is, of course, that lateralization of function is probably taking place during the early years of the education of a child. This possibility forces the question: Is our educational system ignoring the development of at least one-half the potential of its students during the most critical years of that development?

Studies indicate that students enter our process of education with right hemisphere, creative abilities intact. In fact, in early childhood, creativity develops more rapidly than intelligence, because, having a small vocabulary, the child learns mainly through sensing problems for himself/herself. Creativity, at least as measured by testing, continues to grow through the third grade, then drops sharply at the beginning of the fourth grade. By fifth grade, the creativity of girls rises slightly, but is expressed in fluency rather than in originality. Following a slight decline, which is questioned by some researchers, through the seventh and eighth grades, creativity rises until near the end of the high school years, when it gradually comes to a halt (Kneller, p. 73). It is now widely agreed that a person's creative powers grow and reach a peak in the late teens, and unlike intellect, creative capacity is unlikely to develop further. The possibility of the periodic declines in

creativity at certain ages being a culturally determined pattern has been the subject of some debate. With the acquisition of data from recent studies of brain function, might the possibility of general atrophy of the right hemisphere functions due to neglect be considered?

Psychologist, Robert Ornstein, says in his book, THE PSYCHOLOGY OF CONSCIOUSNESS (Harcourt, 1977) that "our intellectual training unduly emphasizes the analytic... Split-and whole-brain studies have lead to a new conception of human knowledge, consciousness, and intelligence. All knowledge cannot be expressed in words, yet our education is based almost exclusively on its written or spoken forms..." (Springer, p. 186).

Duke maintains that "perhaps one of the most powerful ways in which a culture encourages or discourages creative behavior is to punish or reward certain personality characteristics as they develop in children" (Duke, p. 26). If this is true, then not only is the education system not training the potential of one-half of the mind, but the system may actually be discouraging the development of creative, appositional right hemisphere processes. Empirical studies completed by Torrance and his associates ascertained that behavior typified as creative is not the behavior preferred by parents or teachers. From a checklist to determine the ideal child, parents and teachers

chose only two characteristics of creative thinking as being among the most desired qualities a child might possess: independence of thinking and curiosity. However, other characteristics of the creative personality such as asking questions, preferring complex tasks, willingness to take risks, and independence in judgment were considered far less desirable than such attributes as industriousness, determination, sincerity and thoroughness (Duke, p. 10).

Although education and psychology recognize the need for experiences in early childhood that strengthen sensibilities and encourage strong expression, society (and hence the schools) emphasize specialization, and schools ignore the exploratory values of education (Duke, p. 10).

"Because we operate in such a sequential-seeming world and because the logical thought of the left hemisphere is so honored in our culture, we gradually damp out, devalue, and disregard the input of our right hemispheres. It's not that we stop using it altogether; it just becomes less and less available to us because of established patterns" (Prince, pp. 57-61).

Aldous Huxley wrote that "all our mental processes depend upon perception. Inadequate perceiving results in poor thinking, inappropriate feeling, diminished interest in and enjoyment of life. Systematic training in perception should be an essential element in all education"

(Duke, p. ix).

In a 1980 article in ART EDUCATION, pioneer in the study of creativity, E. Paul Torrance, refers to the work of Viktor Lowenfeld and his concept of a "creative intelligence." Lowenfeld emphasizes "the importance of perceptual sensitivities...of visual perception...of auditory, tactual and kinesthetic perceptions..." Also important in his thinking was "aesthetic sensitivity and bringing into harmonious relationships thinking, feeling, and perceiving" (Torrance, ART ED., p. 8).

"Our educational systems may be deficient and may limit a broad spectrum of human capabilities...It may very well be that in certain stages the formation of new ideas involves intuitive processes independent of analytic reasoning or verbal argument. Preliminary schemes ordering new data or reordering preexisting knowledge could possibly arise from even aimless wanderings of the mind during which a connection is seen between a present and past event or a remote analogy is established. But are these right-hemisphere functions? ...(it does not seem to be) as simple as that and there is certainly no conclusive evidence to that effect. Our educational system may miss training or developing half of the brain, but it probably does so by missing out on the talents of both hemispheres" (Springer, p. 192).

Carl Sagan, astronomer-biologist, seems to address the potentials of perceptual training and Lowenfeld's theories concerning a creative intelligence when he speculates about how the two cerebral hemispheres interact in his book, THE DRAGONS OF EDEN (Random House, 1977). He describes the right hemisphere as a pattern recognizer that has a suspicious emotional tone which necessitates the critical analysis of the left hemisphere to test the reality of those patterns. He writes, "There is no way to tell whether the patterns extracted by the right hemisphere are real or imagined without subjecting them to left hemisphere scrutiny...(and) mere critical thinking, without creative or intuitive insights, without the search for new patterns is sterile and doomed. To solve complex problems in changing circumstances requires the activity of both cerebral hemispheres; the path to the future lies through the corpus callosum" (Sagan, p. 54). Sagan describes science as paranoid thinking applied to nature, a search for natural conspiracies, for connections in data:

"Our objective is to abstract patterns from Nature (right hemisphere thinking), but many proposed patterns do not in fact correspond to the data. Thus all proposed patterns must be subjected to the sieve of critical analysis (left hemisphere thinking). The search for patterns,

are the antipodes of incomplete science. The effective pursuit of knowledge requires both functions...(Sagan, p.156).

The implications of Sagan's theories go far beyond those who postulate that a complete education would address only the previous neglect of the right hemisphere capacities, and attempt to correct the problems therein. He says, the "human culture is a function of the corpus callosum...the most significant creative activities of a culture...legal and ethical systems, art and music, science and technology, are the result of collaborative work by the left and right hemispheres..." (Sagan, p. 56). The implications of theories such as those of Sagan and Ornstein, and the research of Sperry, Basser, and others seem to point toward the necessity of developing techniques for teaching and learning that will enable not only the expansion of the neglected abilities of the right hemisphere of the brain, but which will further enable students to develop and to utilize the resources of either or both hemispheres simultaneously. Several such techniques have been developed, and some are in use currently, although no one of them has been widely implemented in American education.

Among the best known of the procedures that have developed to enhance the creativity of individual students

and to help them develop whole-brain cognitive styles are the Creative Future Problem Solving Program for gifted children established by E. Paul Torrance, the techniques of Professor Betty Edwards for developing the visual artistic capacities of students of all ages at California State University and the methods of teaching through creative dramatics using the systems advanced by Winifred Ward and Dorothy Heathcote, both from England. The program designed by Torrance has limited application possibilities. The techniques of Edwards have a much wider potential audience, while the methods of Ward and Heathcote have wide potential for application within the average schoolroom and to the average child.

Developer of the first test for creativity and crusader for the development of programs to develop and utilize the potentials of gifted students, E. Paul Torrance explains his Future Problem Solving Program in a 1980 article in ART EDUCATION. At that time the year-long program involved 60,000 gifted students, grades four through twelve, assigned to participation through tests of intelligence creativity and divergent thinking. Students from schools in Georgia, Idaho, Iowa, Louisiana, Michigan, Montana, and Nebraska are guided through a "systematic creative problem solving process and the development of criteria and their application in

evaluating alternatives" (Torrance, p. 12). Based on his belief that "we have reached a point in civilization at which education must devote a considerable part of the curriculum to helping students enlarge, enrich and make more accurate their images of the future," Torrance is currently devoting much of his time and energy to the development of the "full mental capacities" of these gifted children whom, he believes, "offer the hope of solving the vast array of problems facing mankind in the future" (Torrance, p. 9).

Perhaps the best known of the methods for developing right hemisphere/whole brain capacities, and certainly the most successful within the broad general population are those developed by drawing instructor, Professor Betty Edwards at California State University, and espoused in the popular book, DRAWING ON THE RIGHT SIDE OF THE BRAIN (Los Angeles: J. P. Tarcher, Inc., 1979). Professor Sperry, pioneer researcher in split-brain functions, says of the work of Professor Edwards that "her application of the brain research findings to drawing conforms well with the available evidence and in many places reinforces and advances the right hemisphere story with new observations" (Edwards, cover).

However, the exercises offering the most readily utilized procedures, the broadest possibilities for application, and the greatest potential in a wide variety

of subject areas are the techniques of creative dramatics as an instructional strategy. Aside from their value as a teaching tool, the processes involved have implications for the comprehensive development of the creative or right hemisphere functions, and the utilization of the strengths of both hemispheres both sequentially and simultaneously.

What is "creative dramatics?" Winifred Ward defines creative dramatics as "all forms of improvised drama created by children themselves and played with spontaneous dialogue and action...(it) has its beginnings in the imaginative play of the young child" (Duke, p. 27). Creative dramatics is not children's theatre. Improvisation is the key difference. Unlike children's theatre, where plot, characters, dialogue and action are planned, written, memorized and acted in advance of the actual performance, creative dramatics demands of its participants that all of the elements of theatre, except in certain exercises, the plot, be improvised spontaneously and created out of the imagination of the participants.

Performance for an audience is the objective of children's theatre. Participation in the creation of the drama itself is the objective of creative dramatics. Geraldine Baines Siks says that creative drama is "training for the whole personality...rather than the development of performance skills" (Siks, p. 3). Dorothy Heathcote calls creative dramatics "a technique most

ordinary people regularly employ as a way of coping with a new or unsettling experience" (Wagner, HEATHCOTE, p. 37). Nellie McCaslin says that "drama...demands of the practitioner a total involvement. In offering an opportunity for participation in drama, we are helping to preserve something of the play impulse in all its joy, freedom, and order" (McCaslin, p. 154).

Duke writes that "no matter what approach we take in defining (creative dramatics), running through all the definitions seems to be a common denominator--the role of the imagination. Although we may not completely understand yet the role that imagination (right hemisphere visualization?) plays in the mind's creative activity, we can recognize that the linking of the imagination and creative expression is important for 'imagination is the quality of the mind and spirit that enables one to understand experience beyond his own' " (Duke, p. 4, quoting Coggin's USES OF DRAMA). Heathcote says that creating a drama "allows participants to bring into the present the distant in time and space, making it come alive in our consciousness through imagined group experience" (Wagner, p. 14).

A major factor in this bringing into the present moment through imagined experience is the ability to create through imagery...the seeing of an imaginary picture with the mind's eye. Moates and Schumacher defines imagery as "representing

information in a visual image rather than a verbal image" (Moates and Schumacher, p. 192). According to Edwards, "one of the marvelous capabilities of the right brain is imaging...the brain is able to conjure an image and 'looking' at it, seeing it as if it is 'really there' " (Edwards, p. 37).

Visualizing, pantomime and improvisation of plot, characterization, dialogue, and action all require skills in imaging or visualizing. In fact, much of the preparatory work for creative dramatics, and much of the substance of the Heathcote method of creating drama, involve exercises in imaging or exercises to strengthen the functions typical of the right cerebral hemisphere.

"The languages of imagination do not tell us, but through imagery ask us, to think and feel out of our own experience." Katherine Sorely Walker, author of EYES ON MIME, says that "mime enlarges the powers of the imagination; and imagination is the force that raises (humans) to...the highest level...by making (them) create..." (McIntyre, p. 20).

Improvisation is closely related to pantomime. However, improvisation calls for the delineation of the opening situation in most cases, but the structure which emerges from the experience is unplanned and unpredictable. It appears then that improvisation is a concurrent function

of both the left and right hemispheres because the imagination (right brain function) must create the substance of the drama, while the analytical verbal (left brain function) abilities create structure and dialogue to express the drama.

Dorothy Heathcote defines improvisation as "discovery by trial, error, and testing." She adds that "improvisations provide a special service for experiences in narrative; they translate what happened back to what is happening, and promote a sense of immediacy which might otherwise be lacking...This approach becomes quite important for those students who find it difficult to deal with abstractions" (Wagner, HEATHCOTE, p. 86).

As the dramatic elements develop during the course of the drama, the right hemisphere functions are called upon to create and visualize elements that make up the drama, but "whether material takes finished form depends on what the creator does with (the imagined material). Intellect and judgment must complete the work that imagination has begun" (Kneller, p. 56). Giving the material structure and form, as well as translating it into words and actions are functions of the left hemisphere of the brain.

Consequently, creative dramatics appears to be one successful teaching technique that offers exercises in

functions of each hemisphere of the brain separately, as well as causing a transition of material from one area of functioning to the other, while utilizing the resources of both convergent and divergent thinking in the development of the material.

Some school systems are taking advantages of the possibilities offered by the techniques of creative dramatics in subject areas. The Texas Education Agency in its curriculum guide to creative dramatics calls the technique "both practical and creative...a means toward quicker, more comprehensive conceptual understanding..." (Texas Education Agency, p. 5).

However, creative dramatics offers to the student an experience of greater value than its practical application to a specific subject area. It offers an experience in holistic learning--using both cerebral hemispheres or the whole brain.

Participants are guided through directed activities which offer exercises in the functions of each hemisphere of the brain, while the nature of the development of the drama necessitates the transition of material from one hemisphere to the other. While aiding in both the development of innate creative abilities (right hemisphere function?) and the translation of the created material through verbal and physical action, the participant is led through the phases of the creative process and given

experiences in most, if not all, levels of creativity.

The phases of creativity are:

the impulse to create
preparation
incubation
illumination
verification

The phases were defined by Graham Walls, based on the ideas of the German physiologist, Helmholtz, and popularized by Catherine Patrick (Kneller, p. 47). The phases of creativity are rarely divided so distinctly in practice, but the activities of creative dramatics seem to be analagous.

Although the impulse to create is a natural phenomenon, participation in the drama may well provide the immediate impulse.

The preparation phase is made up of directed games and exercises, mime, role try-ons, and rhythmic movement, as well as research in preparation for the creation of the drama.

The incubation phase involves the development of the drama itself, the improvisation of plot, dialogue and characters, which may grow out of the drama. Developmental material may be gathered through research or it may come from the experiences, both real and vicarious, of the participants. This phase may be separate and

develop as the drama is replayed and changed, or it may continue into the verification phase, as the drama is discussed and analyzed. The incubation phase involves both cerebral functions, but probably involves the right hemisphere functions to a greater extent than the left. The verification phase, however, offers experiences in the left hemisphere cognitive analytical capabilities.

The illumination (or inspiration) phase may happen on an individual or shared basis. It takes place when a participant identifies with the emotions of a purely imaginary character with such empathy that the actor is momentarily transposed into the character. This phase is a communal experience when the various elements of the drama meld to produce a holistic unit. The drama is. In the Heathcote method of drama, the moment of universality, the brotherhood of all humans who have shared such an experience is the moment of illumination.

Illumination is the Ah-Ha! experience for the participant and may happen at any time during the development of the drama, or it may not happen at all. It is unlikely that this phase occurs in each dramatic exercise, and, in fact, might not occur for the average student until a period of involvement for some time in the techniques has passed. However, the value of such an experience for students should make the moment of illumination

one of the major objectives of applying the techniques in the classroom.

The process of creative dramatics also leads the participants through the five levels of creativity:

1. EXPRESSIVE
2. PRODUCTIVE
3. INVENTIVE
4. INNOVATIVE
5. EMERGENTIVE

The EXPRESSIVE level of creativity is experienced during the spontaneous play of children and by some adults involved in games. It is usually not a part of the process of creative dramatics, although certain of the earliest movement exercises might be on this level.

The PRODUCTIVE level of creativity is experienced during the game activities and the controlled exercises, while the techniques of the process are being mastered. Carried to the extreme, this level is the scripted, memorized play performed for an audience.

The INVENTIVE level of creativity is reached when the participants have mastered the techniques to the extent that they can begin to experiment with the materials and techniques, applying them to the ideas developed by members of the group, or to outer-created materials, books, and the interpretation of abstract ideas.

The final step in the process for many participants in creative dramatics might be the INNOVATIVE level, where techniques are refined, skills are conceptualized and applied to new situations, or new techniques are produced as extensions of old ones. The Heathcote method emphasizes this level.

The EMERGENTIVE level may be reached by a group only when "universal insights" are gained as in the Heathcote method. However, this level may be reached on an individual basis whenever a participant gains insight or an understanding of an abstract concept. Whenever an individual creates a new idea or internalizes a concept so that it becomes a part of the mental schemata of that individual, the EMERGENTIVE level occurs in that individual. This is true, no matter how many individuals have earlier reached the same level of understanding (Moates and Schumacher, p. 190).

The materials reviewed in this study indicate that repeated experiences in guided activities through the sequential phases and levels of creativity through guided activities such as creative dramatics will enhance the development of various abilities, the most important of which is the holistic development of the potential of both hemispheres of the brain as well as the creativity inherent in each individual. Creative dramatics appears to be a

practical technique applicable to the classroom learning situation which would encourage the development of the capabilities of the whole brain of each individual involved in the educational system.

In practical application the techniques of creative dramatics may be used to teach almost any subject necessitating the organization of ideas, and the retention of those ideas in memory until written expression can take place, as well as reinforcing specific mechanical, sequencing, and imagery skills. The Texas Education Agency introduces its curriculum guide for creative dramatics by stating that the use of the techniques "enables children...to reinforce academic subjects...develop the processes of concentration, analysis, evaluation, inference and creativity...Drama is at once practical and creative...it is a means toward quicker, more comprehensive conceptual understanding...as a bridge, children can quickly grasp certain concepts..It strengthens the integration of thought, action and language..." (TEA, p. 1).

As Betty Edwards writes in DRAWING ON THE LEFT SIDE OF THE BRAIN, "perhaps now that neuroscientists have provided a conceptual base for right-brain training, we can build a school system that will teach the whole brain..." (Edwards, p. 37). The use of creative dramatics as an instructional technique in all disciplines may provide

a practical first step toward a curriculum which will allow for the development of the full potential of the human brain.

Psychologist Frank Hajcak writes that the "creative process must be learned just as logical thinking...it is an aspect of human intelligence just as is logical thinking...most educators take far too narrow view of creativity. They restrict the teaching of creativity to elective courses such as art or music. There are no limits to its application across fields. Creativity is truly infinite .... It can be applied to any field, not just the arts. It is useful in science, industry, government, sociology, business, and even in our daily lives. We must learn to see creativity (or holistic thinking) as the essence of education, not an adjunct."

Duke writes that the potential for using the creative process in holistic thinking must be developed "because it is becoming increasingly evident that not only mankind's progress, but his very survival may depend on creative ability that (the individual) brings to a world being made, paradoxically, both larger and smaller by science and technology" (Duke, p. 5).

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